

**EXPRESS MAIL CERTIFICATE**

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APPLICANT(S) : Norbert Moszner, Thomas Völkel, Volker Rheinberger, and  
Ulrich Schubert

TITLE : DENTAL MATERIALS BASED ON METAL OXIDE  
CLUSTERS

Certificate is attached to the **Preliminary Amendment (4 pages)** with  
**Appendix A (2 pages)** of the above-named application.

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DATE OF DEPOSIT: **January 18, 2002**

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Arlington, Virginia 22202, **Box: Patent Application.**

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*Ruth R. Smith*  
(Signature of person mailing paper or fee)

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant(s) :	Norbert Moszner, Thomas Völkel, Volker Rheinberger, and Ulrich Schubert	)	Examiner:
		)	To Be Assigned
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Serial No. :	To Be Assigned	)	Art Unit:
		)	To Be Assigned
Cnfrm. No. :	To Be Assigned	)	
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Filed :	Herewith	)	
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For :	DENTAL MATERIALS BASED ON METAL OXIDE CLUSTERS	)	
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PRELIMINARY AMENDMENT

U. S. Patent and Trademark Office  
Box 2327  
Arlington, Virginia 22202  
**Box: Patent Application**

Dear Sir:

Please amend the above-identified patent application as follows:

In the Specification:

In the first line of the specification following the title please insert the following paragraph:

This application claims the benefit of U.S. Provisional Patent Application No. 60/306,093, filed July 17, 2001, which is herein incorporated by reference in its entirety.

In the Claims:

Please delete claim 13 and replace claims 3-12 with amended claims 3-12 as follows:

3. (Amended) Dental material according to claim 2, characterized in that L-Sp-Z stands for acrylate, methacrylate, oleate, allyl acetoacetate and/or acetoacetoxyethyl methacrylate.

4. (Amended) Dental material according to claim 2, characterized in that the clusters 1 to 4 contain kinds of ligands of the type L-Sp-Z.

5. (Amended) Dental material according to claim 2, characterized in that the cluster has a monodisperse mass distribution.

6. (Amended) Dental material according to claim 2, characterized in that the indices c to f assume values such that the positive charges of the metal or metals are completely equalized.

7. (Amended) Dental material according to claim 2, characterized in that  $M^1$  is equal to  $M^2$ .

8. (Amended) Dental material according to claim 2, characterized in that it contains one or more further polymerizable components.

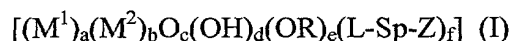
9. (Amended) Dental material according to claim 8, characterized in that the further polymerizable component is a polymerizable polysiloxane, an ionically and/or radically polymerizable organic monomer or a mixture thereof.

10. (Amended) Dental material according to claim 2, characterized in that it contains an initiator for ionic and/or radical polymerization, filler and/or further additives.

11. (Amended) Dental material according to claim 1, characterized in that it contains, relative to its overall mass

- (a) 5 to 90 wt.-% of at least one cluster according to formula (I),
- (b) 10 to 90 wt.-% of a further polymerizable component,
- (c) 0.1 to 5.0 wt.-% polymerization initiator, and
- (d) 0 to 90 wt.-% filler.

12. (Amended) A cluster of the general formula



in which

$M^1, M^2$	independently of each other, stand for a metal atom of the IIIrd or Vth main groups or the Ist to VIIIth sub-groups of the periodic table;
R	is an alkyl group with 1 to 6 carbon atoms;
L	is a co-ordinating group with 2 to 6 complexing centres;
Sp	is a spacer group or is absent;
Z	is a polymerizable group;
a	is a number from 1 to 20;
b	is a number from 0 to 10;
c	is a number from 1 to 30;
d, e	independently of each other, are in each case a number from 0 to 30;
f	is a number from 2 to 30,

any charge of the cluster (I) present being equalized by counterions, comprising a dental material which is an adhesive, coating material, cement or filling material.

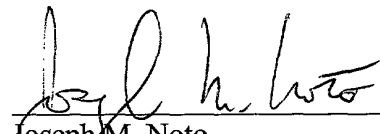
**REMARKS**

Entry of the foregoing in advance of the initial Office Action is respectfully requested.

By the present preliminary amendment, claim 13 has been deleted and claims 3-12 have been amended to conform the foreign language originating text to U.S. practice. Pursuant to 37 CFR § 1.121, attached as Appendix A is a Version of the Claims With Markings to Show Changes Made.

Early allowance of the pending claims is hereby earnestly solicited.

Respectfully submitted,

  
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Joseph M. Noto  
Registration No. 32,163

Date: January 18, 2002

NIXON PEABODY LLP  
Clinton Square, P.O. Box 31051  
Rochester, New York 14603  
Telephone: (585) 263-1601  
Facsimile: (585) 263-1600

## Appendix A

### Version of the Claims With Markings to Show Changes Made

In reference to the amendments made herein to claims 3-12, additions appear as underlined text, while deletions appear as bracketed text, as indicated below:

#### In The Claims:

3. (Amended) Dental material according to claim 2 [or 3], characterized in that L-Sp-Z stands for acrylate, methacrylate, oleate, allyl acetoacetate and/or acetoacetoxyethyl methacrylate.

4. (Amended) Dental material according to [one of] claim[s] 2 [to 4], characterized in that the clusters 1 to 4 contain kinds of ligands of the type L-Sp-Z.

5. (Amended) Dental material according to [one of] claim[s] 2 [to 5], characterized in that the cluster has a monodisperse mass distribution.

6. (Amended) Dental material according to claim 2 [or 6], characterized in that the indices c to f assume values such that the positive charges of the metal or metals are completely equalized.

7. (Amended) Dental material according to [one of] claim[s] 2 [to 7], characterized in that  $M^1$  is equal to  $M^2$ .

8. (Amended) Dental material according to [one of] claim[s] 2 [to 8], characterized in that it contains one or more further polymerizable components.

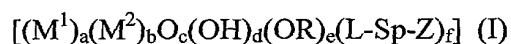
9. (Amended) Dental material according to claim [9]8, characterized in that the further polymerizable component is a polymerizable polysiloxane, an ionically and/or radically polymerizable organic monomer or a mixture thereof.

10. (Amended) Dental material according to [one of] claim[s] 2 [to 10], characterized in that it contains an initiator for ionic and/or radical polymerization, filler and/or further additives.

11. (Amended) Dental material according to claim 1 [one of the previous claims], characterized in that it contains, relative to its overall mass

- (a) 5 to 90[%] wt.-% of at least one cluster according to formula (I),
- (b) 10 to 90 wt.-% of a further polymerizable component,
- (c) 0.1 to 5.0 wt.-% polymerization initiator, and
- (d) 0 to 90 wt.-% [wt.-%] filler.

12. (Amended) [Use of a] A cluster of the general formula



in which

$M^1$ ,  $M^2$  independently of each other, stand for a metal atom of the IIIrd or Vth main groups or the Ist to VIIIth sub-groups of the periodic table;

- R is an alkyl group with 1 to 6 carbon atoms;
- L is a co-ordinating group with 2 to 6 complexing centres;
- Sp is a spacer group or is absent;
- Z is a polymerizable group;
- a is a number from 1 to 20;
- b is a number from 0 to 10;
- c is a number from 1 to 30;
- d, e independently of each other, are in each case a number from 0 to 30;
- f is a number from 2 to 30,

any charge of the cluster (I) present being equalized by counterions, comprising a [as] dental material [or for the preparation of a dental material] which is an adhesive, coating material, cement or filling material.